UCLA Innovation Fund
MedTech Track
Portfolio Update Newsletter

June 2020
UCLA Innovation Fund #1711: Polymer for Antimicrobial Coating on Orthopedic Implants

**ACHIEVEMENTS-TO-DATE**
- Identified regulatory path for filing combined product – kitting with an existing product avoids drug pathway
- *In vitro* testing on multiple surfaces

**SEEKING PARTNERSHIP**
- Need Marketing partner for first indication and for 510K
- Regulatory partner needed for Humanitary device exemption filing

**Problem**
- Implants carry up to 20% risk of infection and represent the **#1 cause of surgical failure**
- Due to biofilm formation, implant infection is especially difficult to treat

**Solution**
- Novel polymer which can be mixed with antibiotic of choice
- “Varnish” can then be applied onto implants intraoperatively to prevent infection

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**Completed**
- Optimization of polymer
- Initial Clinical Validation
- Benchtop testing (various metals and abs)

**In Progress**
- Marketing partner identification
- FDA pre-sub planning
- Confirmatory Clinical Validation

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**Nicholas Bernthal, MD**  
Assistant Professor  
Orthopaedic Surgery

**Tatiana Segura, PhD**  
Professor,  
Chemical and Biomolecular Engineering
UCLA Innovation Fund #1811: Next Gen Optical Coherence Tomography (OCT)

**Problem**

- Optical Coherence Tomography (OCT) is the standard imaging tool for diagnosis and monitoring of many ophthalmic pathologies
- OCT has a **long acquisition time** (2-3 secs) which results in artifacts due to eye movement

**Solution**

- Novel OCT modality based on chip-scale laser frequency combs
- Results in **100x faster** acquisition speed and **40x improvement** in axial resolution

**Completed**

- On-chip module with photonic and electronic circuit integration
- Optical interface between laser and OCT
- Software development and optimization

**In Progress**

- Clinical validation
- Package validation model

**ACHIEVEMENTS-TO-DATE**

- Integrated lab-built light source into research systems
- Demonstrated image acquisition with light source

**SEEKING PARTNERSHIP**

- Validation model form factor
- Clinical validation required

Chee Wei Wong, PhD
Professor, Engineering

Kourosh Nouri-Mahdavi, MD
Associate Professor, Ophthalmology
# UCLA Innovation Fund #1813:
Blood-based biomarker to diagnose irritable bowel syndrome (IBS)

<table>
<thead>
<tr>
<th>ACHIEVEMENTS-TO-DATE</th>
<th>SEEKING PARTNERSHIP</th>
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<tr>
<td>Community hospitals recruited for ongoing patient acquisition</td>
<td>Partners with access to high volume of blood samples</td>
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<td>60% of required samples acquired</td>
<td>Commercialization partner preferably with paired therapeutic</td>
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<td>Currently on hold for COVID</td>
<td>Reimbursement partner</td>
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## Problem
- Irritable Bowel Syndrome is a common disease with a prevalence of 11%
- Viewed as a **diagnosis of exclusion** with symptom-based diagnosis
- “Rule out” tests to exclude other diseases are **expensive and time consuming**

## Solution
- **Blood-based diagnostic** test using DNA methylation markers
- Ability to **distinguish IBS from healthy controls** as well as from more serious diseases such as inflammatory bowel disease (IBD)

## Completed
- DNA biomarkers to differentiate IBS from healthy controls
- Local patient recruitment

## In Progress
- Compare DNA profiles with other GI diseases that present symptoms that mimic IBS
- Generate DNA methylation data in patient samples

**Lin Chang, MD**
Professor and Vice-chief, Medicine

**Swapna Joshi, PhD**
Adjunct Assistant Professor, Medicine
UCLA Innovation Fund #1815: Novel Nanostructured Osteoconductive Periodontal Membrane

**ACHIEVEMENTS-TO-DATE**
- Market exploration begun, but all lab work on pause until return to lab

**SEEKING PARTNERSHIP**
- Commercial partners for initial application
- Regulatory partners

**Problem**
- Periodontitis affects nearly 50% of the adult U.S. population with severe forms leading to tooth loss
- Current guided tissue regeneration (GTR) membranes lack suitable mechanical properties

**Solution**
- Current disadvantages of surgical manipulation of bones and soft tissues result in the need for improved systems and methods
  - Manual force limits both the magnitude, duration and precision of manipulation
  - Manual manipulation exposes the surgeon and surgical assistants to increased radiation

**Completed**
- Alpha prototype electrospun membrane
- Antibacterial testing in vitro and in vivo
  - In vitro biodegradation testing

**In Progress**
- Initial Clinical Validation
  - Optimize coated membranes with tunable biodegradability and physical properties

**Achievements to Date**

**In Progress**

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Paul S. Weiss, PhD  
Distinguished Professor, Chemistry & Biochemistry  
Materials Science & Engineering

Alireza Moshaverinia, PhD  
Assistant Professor, Dentistry
UCLA Innovation Fund #1911: Articulated Rigid Traction System

**ACHIEVEMENTS-TO-DATE**
- Contracted with design-manufacturer for first validation model
- Completed gap analysis
- Started regulatory filing

**SEEKING PARTNERSHIP**
- Clinical partners for first-in-man studies
- Commercial partners for sales channel

**Problem**
- Current disadvantages of surgical manipulation of bones and soft tissues result in the need for improved systems and methods
  - Manual force limits both the magnitude, duration and precision of manipulation
  - Manual manipulation exposes the surgeon and surgical assistants to increased radiation

**Solution**
- Novel Articulated Rigid Traction System for orthopaedic fracture management
  - Simple to operate
  - Precise positioning unstable bone fragments during surgery

**Completed**
- Alpha prototype completed and tested
- IRB Approval of protocol
- Market landscaping and customer profiles

**In Progress**
- Clinical testing of the prototype
- Redesign and fabrication

Nelson F. SooHoo, MD
Orthopaedic Surgery, Ronald Reagan UCLA Medical Center
UCLA Innovation Fund #1912: A Wearable Platform Detecting Cortisol Levels for Stress Management

ACHIEVEMENTS-TO-DATE
- Started circuit surface engineering prior to shutdown
- Ongoing market exploration work

SEEKING PARTNERSHIP
- Partners with consumer or research applications for sensor

Problem
- Current technologies lack capability to obtain and analyze molecular-level information, which is critical to assessing human health

Solution
- Aptamer-based sensor interface that can sample sweat to detect cortisol levels non-invasively
  - Allows monitoring of stress mgmt in real-time
  - Tech can be integrated to current "solutions"

Completed
- Initial prototype created
- Aptamer based chemistry optimized
- Market Indication identified

In Progress
- Sensor validation
- Sweat collection and sensor development
- Develop analytical framework

Sam Emaminejad, PhD
Assistant professor, Electrical Engineering

Janet Tomiyama, PhD
Associate professor, Psychology
UCLA Innovation Fund #1913: Point-of-care Detection Device for Cerebrospinal Fluid Leaks

**Problem**

- Currently available tests for beta-2 transferrin takes too long and cannot guide decision-making in clinical work-up

**Solution**

- A rapid (~20 min), point-of-care device to discern cerebrospinal fluid (CSF) leakage

**Achievements-to-Date**

- Sensitivity and specificity validated in small patient sample, currently expanding to larger patient sample

**Seeking Partnership**

- Antibody supply at scale
- Commercialization and manufacture partner

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**Completed**

- Antibodies identified
- Establish sensitivity & specificity
- Lateral flow assay optimized

**In Progress**

- Expand validation Study
- Scale up access to antibodies
UCLA Innovation Fund #1914: Intraocular Robotic Interventional Surgical System for Cataract Removal

**Problem**

- **Incomplete lens removal** and other **surgical complications** occur frequently in the majority of cataracts patients due to lack of visualization and anatomical constraints
  - *Aim*: to develop **supporting technology** to improve cataract surgical outcomes

**Solution**

- A 4-part system for equator and posterior capsule (PC) polishing to additional surgical complications
  - Eye-stabilization device
  - Intraocular OCT probe
  - Real-time image segmentation algorithm
  - Touch-probe sensor

**Achievements-to-date**

- Steady improvement in performance of autonomous module
- Continued lab work temporarily on hold for crisis, will resume in July

**Seeking partnership**

- Regulatory partnership
- Experienced VC funding

**Completed**

- Alpha prototype platform built
- Proof of concept study
- Custom automation software optimized

**In Progress**

- Develop real-time image-processing algorithm
- Surgeon console
- Embed intraocular OCT probe

Jacob Rosen, PhD  
Director, Bionics Laboratory

Jean-Pierre Hubschman, MD  
Attending surgeon, Stein Eye Institute

Tsu-Chin Tsao, PhD  
Director, Mechatronics and Controls Laboratory
UCLA Innovation Fund #1915:
A Novel Dental Remineralization Filling for Dental Caries

**Problem**
- The **current SOC for dental caries ineffectively addresses secondary or recurrent caries**

**Solution**
- A novel dental restorative (filling) material which
  - Stimulates natural mineral hydroxyapatite formation that **remineralizes demineralized enamel or dentin**
  - Bonds directly to tooth structure, prevents microleakage
  - Tooth colored, prevents secondary caries

**ACHIEVEMENTS-TO-DATE**
- Progress made on material parameters
- Started market exploration

**SEEKING PARTNERSHIP**
- Regulatory partnership
- Commercial partner for sales channel testing

**Completed**
- Demonstrated mechanical strength, bond strength and sharp setting time
- Demonstrated *in-vitro* hydroxyapatite remineralization

**In Progress**
- Further develop production of PDA filler
- Clinical validation
- Biocompatibility testing

Alireza Moshaverinia  
D.D.S., M.S., Ph.D., F.A.C.P.  
Assistant Professor, UCLA School of Dentistry

Mohammad Mahdi Hasani-Sadrabadi  
Ph.D  
Project Scientist UCLA Bioengineering
Thank You